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ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 11/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/550,649	GUERTIN ET AL.
	Examiner	Art Unit
	David S. Kim	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Applicant's response to the objections to **claims 17-19** in the previous Office Action (mailed on 02 June 2006) is noted and appreciated. Applicant responded by amending these claims. Applicant's amendments overcome the previous objections, which are presently withdrawn.

Claim Rejections - 35 USC § 112

2. Applicant's response to the rejection of **claims 1-8, 12-16, and 18-21** in the previous Office Action (mailed on 02 June 2006) is noted and appreciated. Applicant responded by amending the claims to remove the limitations regarding the Q parameter. Applicant's amendments overcome the previous rejection, which is presently withdrawn.

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 1-22** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Notice the following limitations from independent claims 1, 5, and 9:

(claim 1) identifying, with a diagnostics analyzer that analyzes a plurality of transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output signals from each optical receiver, which of the N optical communication channels has an associated bit error rate value that is greater than a specified bit error rate value, and thus is a faulty communication channel that needs correction, ***as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs*** (emphasis Examiner's).

(claim 5) identifying, with a diagnostics analyzer that analyzes a plurality of transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output

signals from each optical receiver, at least one faulty communication channel from said plurality of optical communication channels in the wavelength division optical communication system by performing a bit parity check for each transmitter/receiver pair because the measured bit error rate is greater than a predetermined system bit error rate threshold, ***as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs*** (emphasis Examiner's).

(claim 9) a diagnostic analyzer to analyze diagnostic output signals from said transmitters and said receivers and to identify at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check because said measured bit error rate is greater than said predetermined bit error rate threshold ***as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs*** (emphasis Examiner's).

In one reading of these claims, the ***identification of the faulty communication channel*** is "determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs". However, the specification only discloses that such identification is determined by the *diagnostic analyzer* (p. 11, 1st paragraph). Although the performance monitors play a role in this identification process, they only do so by providing diagnostic signals that indicate numbers of bit errors (p. 9-10, bridging paragraph). Accordingly, under this first reading of these claims, these claims contain new matter.

In another reading of these claims, the ***conclusion that a particular bit error rate is greater than another specific bit error rate*** is "determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs". However, the specification appears to suggest that such a conclusion is only determined by the *diagnostic analyzer* (p. 11, 1st paragraph). Although the performance monitors play a role in this conclusion process, they only do so by providing diagnostic

signals that indicate numbers of bit errors (p. 9-10, bridging paragraph). Accordingly, under this second reading of these claims, these claims contain new matter.

As a remedy, Examiner respectfully suggests amending the claim language to remove this determination limitation from the independent claims. As another remedy, Examiner respectfully suggests amending the claim language to more accurately capture the role of the performance monitors in Applicant's claimed invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. **Claims 1-22** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As noted above under the rejection of claims 1-22 under 35 U.S.C. 112, first paragraph, there are two readings of the determination limitation in the independent claims. Such a multiplicity of readings shows that these claims are indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. As a remedy, Examiner respectfully suggests amending the claim language to remove this determination limitation from the independent claims. As another remedy, Examiner respectfully suggests amending the claim language to remove this multiplicity of readings of the determination limitation.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Juniper

9. **Claims 1-2, 12-14, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper ("Juniper Networks M40 Internet Backbone Router Inter-operating with the CIENA MultiWave Sentry DWDM System") in view of the admitted prior art (hereinafter "the APA") and Waschka, Jr. (U.S. Patent No. 4,449,247).

Regarding claim 1, Juniper discloses:

A method of testing a bit error rate for each of a plurality (*N*) of (multiple spans in Fig. 9) optical communication channels, *N* being greater than 2, in a wavelength division multiplexed optical communication system (the Sentry DWDM system is a WDM system) having *N* optical transmitters (transmitter modules in Sentry 1600, not shown) communicating to *N* optical receivers (receiver modules in Sentry 1600, not shown) via *N* communication channels, the *N* optical receivers being co-located (co-location in a Sentry module in Fig. 9) with each other and with the *N* optical transmitters for testing the method comprising:

cascading (concatenated spans in Fig. 9) said *N* optical communication channels such that an electrical (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters) output of an optical receiver *i* for an optical communication channel *i* is connected to an input of an optical transmitter *i+1* for an optical communication channel *i+1*, for all values of *i* from one to *N-1*, so as to form a continuous cascade of a co-located plurality of optical transmitter/receiver pairs (cascaded transmitter/receiver pairs implied in Fig. 9);

supplying (signal from BERT on p. 8) a bit error rate test signal from a bit error rate tester (BERT on p. 8) to an input for a first optical transmitter for a first optical communication channel;

supplying (implied by return of BERT test signal from concatenated spans to BERT unit on p. 8) the bit error rate test signal from an output of optical receiver *N* to the bit error rate tester.

Juniper does not expressly disclose:

detecting errors in the bit error rate test signal received by the bit error rate tester and calculating therefrom a measured system bit error rate.

However, such detecting is the general purpose of BERT units, such as in the one mentioned on p. 8 of Juniper. Although the system in the method of Juniper was tested as error free, if the system were further lengthened so that the errors would start to appear, then the BERT of Juniper would detect such errors. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to further lengthen the transmission distance or to further increase the number of spans of Juniper. One of ordinary skill in the art would have been motivated to do this for the common purpose of finding out the transmission limits of the system, such limits being correlated to detected errors.

Juniper also does not expressly disclose:

comparing the measured system bit error rate with a predetermined system bit error rate threshold;

monitoring a signal quality for the bit error rate test signal at each of the *N* optical transmitters and each of the *N* optical receivers <u>in the wavelength division multiplexed optical communication system</u> when the measured system bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which of the *N* optical communication channels has an associated bit error rate value that is greater/less than a specified bit error rate value<u>; and</u>

<u>identifying, with a diagnostics analyzer that analyzes a plurality of transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output signals from each optical receiver, which of the N optical communication channels has an associated bit error rate value that is greater than a specified bit error rate value, and thus is a faulty communication channel that needs</u>

correction, as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs.

However, Waschka, Jr. discloses such comparing (col. 31, lines 3-4) and monitoring (col. 19, lines 30-59, col. 31, lines 5-21; note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38) as part of a fault location technique (col. 19, lines 30-59). This fault location technique of Waschka, Jr. also includes a step of identifying a faulty communication channel (col. 5, l. 40-42, col. 31, l. 19-21) with a diagnostics analyzer (alarm units in Figs. 10-11; diagnostic output signals in col. 3, l. 30-45; col. 19, l. 30-40) and performance monitors (BER circuitry in each station, col. 19, l. 30-33) that is similar to Applicant's step of identifying. Although Juniper is silent about fault location, the APA teaches fault location for WDM optical communication systems. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement at least some fault location teachings in the method of Juniper. One of ordinary skill in the art would have been motivated to do this since Juniper is silent about fault location and the APA teaches that fault location for WDM optical communication systems enables the common benefit of troubleshooting and repairing equipment related to located faults (Applicant's specification, p. 3, 2nd full paragraph), thus improving the quality and maintenance of the system.

Accordingly, at the time the invention was made, it would have also been obvious to one of ordinary skill in the art to further employ the fault location teachings of Waschka, Jr. in the method of Juniper in view of the APA. One of ordinary skill in the art would have been motivated to do this since, although the APA teaches that fault location may be desirable, Juniper is silent about the technical details of any particular fault location technique. Waschka, Jr. speaks into that silence by providing a fault location technique. Note that the fault location teachings of Waschka, Jr. may be suitable for the method of Juniper due to the similarities of the systems of Waschka, Jr. and Juniper, such as: BER testing units (Juniper, BERT on p. 8; Waschka, Jr., bit error rate test unit 22 in Fig. 8), cascaded optical communication channels (Juniper, concatenated spans in Fig. 9; Waschka, Jr., cascaded channel links in Fig. 1, col. 19, lines 25-28), and optical transmitter/receiver pairs (Juniper, transmitter/receiver pairs implied in Fig. 9; Waschka, Jr., Figs. 2-4, optical transceivers).

Juniper in view of Waschka, Jr. does not expressly disclose:

the diagnostic analyzer analyzing a plurality of *transmitter diagnostic output signals* ***from each optical transmitter*** and a plurality of *receiver diagnostic output signals* ***from each optical receiver*** (emphasis Examiner's).

Rather, the diagnostic analyzer of Juniper in view of Waschka, Jr. analyzes a plurality of diagnostic output signals (col. 3, l. 30-45; col. 19, l. 30-40), each diagnostic output signal being from a transmitter/receiver pair (stations in Fig.1). Although the diagnostic output signals of Waschka, Jr. are not from *each* transmitter and receiver, modifying the apparatus of Waschka, Jr. to do so is obvious. That is, consider the basic technique of decentralizing a singular process from one location to multiple locations. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to decentralize the fault location process from a transmitter/receiver pair in Waschka, Jr. to other locations, such as each transmitter and each receiver. One of ordinary skill in the art would have been motivated to do this for at least one common motivation for decentralizing a singular process from one location to multiple locations, such as increasing the granularity of fault detection and location. That is, increasing the number of locations for fault detection and location leads to more precise fault location.

Regarding claim 2, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein said predetermined system bit error rate is equal to the specified bit error rate for each of *N* optical communication channels (Waschka, Jr. teaches the same error rate for a system BER and a channel-specific BER, see "prescribed level" in claims 11-12).

Regarding claim 12, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein said monitoring monitors a received signal quality (Waschka, Jr., col. 19, lines 30-59, col. 31, lines 5-21) for the bit error rate test signal (Waschka, Jr., "test sequence" and "test signal") supplied by the bit error rate tester, as the bit error rate test signal is propagating from the input for the first optical transmitter to the output of the optical receiver *N*.

Regarding claim 13, Juniper in view of the APA and Waschka, Jr. does not expressly disclose:

The method of claim 1, further comprising:

indicating that a bit error rate for each of the *N* optical communication channels is less than a specified bit error rate value when the measured bit error rate is less than or equal to the predetermined system bit error rate threshold.

However, Waschka, Jr. does disclose providing a BER indication for each of the channels when the measured system BER is unacceptable (Waschka, Jr., col. 19, lines 30-42). In the case that the measured system BER is acceptable (the measured bit error rate is less than or equal to the predetermined system bit error threshold), it would be obvious to a person of ordinary skill in the art to set the BER of each of the communication channels to be less than a specified BER, that is, the predetermined system bit error rate threshold. One of ordinary skill in the art would have been motivated to do this in order to keep the system BER less than the predetermined system bit error rate threshold. More exactly, the system BER is the cumulative sum of the channel BER values. Thus, if the BER of each communication channel were less than the predetermined system bit error rate threshold, the system BER would be less than that same threshold. Accordingly, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to also include said indicating. One of ordinary skill in the art would have been motivated to do this to show the status of the communication channels, informing maintenance personnel of the BER status of the communication channels (Waschka, Jr., col. 5, lines 22-27).

Regarding claim 14, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein the monitoring of the bit error rate test signal is performed at an input (Waschka, Jr., note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38) of each of the *N* optical transmitters and *N* optical receivers.

Regarding claim 20, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein the optical transmitters and receivers for the *N* optical communication channels are co-located (Juniper, co-location in a Sentry module in Fig. 9; Waschka, Jr., Figs. 2-4, optical transceivers).

10. **Claims 3-11, 15-19, and 21-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper in view of the APA and Waschka, Jr. as applied to claim 1 above, and further in view of Bullock et al. (U.S. Patent No. 5,764,651, hereinafter "Bullock").

Regarding claim 3, Juniper in view of the APA and Waschka, Jr. does not expressly disclose:

The method of claim 1, wherein said monitoring said signal quality includes a bit parity check.

Bullock teaches a method of testing a bit error rate for optical communication systems that includes a bit parity check (Bullock, col. 1, l. 57-67). This method is a part of a common and extremely well known communications network standard, SONET (Bullock, col. 1, l. 57). Juniper already employs SONET (Juniper, p. 3, 1st paragraph). Also, a bit parity check is known as a common technique for monitoring signal quality (BER), so a bit parity check would be an obvious method for one to employ in said monitoring of signal quality.

Regarding claim 4, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 1, wherein said monitoring includes monitoring a bit interleave parity (Bullock, col. 1, l. 57-67) for said bit parity check on each electrical signal in the *N* optical transmitter/receiver pairs.

Regarding claim 5, claim 5 is a method claim that corresponds largely to the method claim 3. Therefore, the recited steps in method claim 3 read on the corresponding steps in method claim 5. Claim 5 also includes limitations absent from claim 3. Juniper in view of the APA, Waschka, Jr., and Bullock also discloses these limitations:

the transmitters being co-located with each other and with the receivers for testing (Juniper, co-location in Sentry module(s) in Fig. 9);

co-located plurality of optical transmitter/receiver pairs (Juniper, co-location in Sentry module(s) in Fig. 9); and

identifying at least one faulty communication channel from said plurality of optical communication channels (Waschka, Jr., col. 5, lines 45-49) by performing a bit parity check (Bullock, col. 1, l. 57-67) for each transmitter/receiver pair (Waschka, Jr., note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42) because the measured bit error rate

(Waschka, Jr., col. 31, lines 3-4) is greater than a predetermined system bit error rate threshold (Waschka, Jr., col. 31, line 4).

Regarding claim 6, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, further comprising monitoring (Waschka, Jr., col. 19, lines 30-59, col. 31, lines 5-21) a signal quality for the at least one faulty communication channel using an internal performance monitor (Waschka, Jr., BER test circuitry in each station, col. 19, lines 30-33).

Regarding claim 7, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 6, wherein said internal performance monitor checks a signal transmitted through the at least one faulty communication channel (Waschka, Jr., col. 19, lines 25-42).

Regarding claim 8, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, further comprising passing said bit error rate test signal through said plurality of optical communication channels (Juniper, concatenated spans in Fig. 9; Waschka, Jr., channel links between stations, col. 19, lines 18-30).

Regarding claim 9, claim 9 is a system claim that corresponds largely to the method claim 3. Therefore, the recited steps in method claim 3 read on the corresponding means in system claim 9. Claim 9 also includes limitations absent from claim 3. Juniper in view of the APA, Waschka, Jr., and Bullock also discloses these limitations:

the transmitters being co-located with each other and with the receivers for testing (Juniper, co-location in Sentry module(s) in Fig. 9);

a co-located plurality of transmitter/receiver pairs (Juniper, co-location in Sentry module(s) in Fig. 9); and

a diagnostic analyzer (Waschka, Jr., alarm units in Figs. 10-11) to analyze diagnostic output signals (Waschka, Jr., col. 5, lines 31-49) from said transmitters and said receivers and to identify (Waschka, Jr., col. 5, lines 40-42, col. 31, lines 19-21) at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check (Bullock, col. 1, l. 57-67) because said measured bit error rate (Waschka, Jr., col. 31, lines 3-4) is greater than said predetermined bit error rate threshold (Waschka, Jr., col. 31, line 4).

Regarding claim 10, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The system of claim 9, further comprising an internal performance monitor (Waschka, Jr., BER test circuitry in each station, col. 19, lines 30-33) coupled to said diagnostic analyzer.

Regarding claim 11, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The system of claim 10, wherein said internal performance monitor comprises an error monitoring unit (Waschka, Jr., Fig. 7, col. 15, line 64 – col. 16, line 4).

Regarding claim 15, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, wherein the plurality of optical communication channels include three or more optical communication channels that are cascaded (Juniper, up to 24 concatenated spans in Fig. 9; Waschka, Jr., note each link between each pair of stations in Fig. 1).

Regarding claim 16, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, wherein the identifying at least one faulty communication channel monitors (Waschka, Jr., col. 19, lines 30-59, col. 30, lines 61-68, col. 31, lines 5-21) the signal quality of the bit error rate signal (Waschka, Jr., col. 9, line 63 – col. 10, line 3, col. 30, lines 61-68, col. 31, lines 3-21), as the bit error rate test signal is propagating from the input for the first optical transmitter through the continuous cascade of transmitter/receiver pairs.

Regarding claim 17, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The system of claim 9, wherein the plurality of optical communication channels include three or more optical communication channels that are cascaded (Juniper, up to 24 concatenated spans in Fig. 9; Waschka, Jr., note each link between each pair of stations in Fig. 1).

Regarding claim 18, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The system of claim 9, wherein the diagnostic analyzer is configured to analyze the diagnostic output signals (Waschka, Jr., col. 5, lines 31-49) from said transmitters and receivers in response to monitoring (Waschka, Jr., col. 19, lines 30-59, col. 30, lines 61-68, col. 31, lines 3-21) a signal quality of the bit error rate signal (Waschka, Jr., col. 9, line 63 – col. 10, line 3, col. 30, lines 61-68, col. 31, lines 3-21) input to each of said transmitters and said receivers (Waschka, Jr., note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42).

Regarding claim 19, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The system of claim 18, wherein each of said transmitters and said receivers (Waschka, Jr., note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38; note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42) is configured to monitor the signal quality of the bit error rate signal supplied by the bit error rate tester, as the bit error rate test signal is propagating from the input of the first optical transmitter to the final optical receiver.

Regarding claim 21, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, wherein the plurality of optical communication channels are arranged in the continuous cascade by connecting electrical outputs of optical receivers to inputs of optical transmitters in the plurality of transmitter/receiver pairs (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters).

Regarding claim 22, Juniper in view of the APA and Waschka, Jr. in view of Bullock disclose:

The method of claim 9, wherein the plurality of optical communication channels are arranged in the continuous cascade by connecting electrical outputs of optical receivers to inputs of optical transmitters in the plurality of transmitter/receiver pairs (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters).

Response to Arguments

11. Applicant's arguments filed on 02 June 2006 against the rejection of claims under 35 U.S.C. 103(a) have been fully considered but they are not persuasive. Applicant presents four salient points.

Regarding the first point, Applicant states (p. 11, last paragraph – p. 12, 1st full paragraph):

> In regard to 1) comparing the measured system bit error rate with a predetermined system bit error rate threshold, which, as Examiner has noted in not taught or suggested in Juniper but would be obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr., Applicants respectfully disagree. Waschka, Jr. merely teaches "transmitting a test signal . . . ." (col. 30, line 62); "monitoring . . . said test signal as test signal is looped back from said first selected communication channel and received over said second communication channel," (col. 30, lines 65-69) and "monitoring that the quality of said test signal is less than a prescribed level . . ." (col. 31, lines 3-4). Applicants note that Waschka, Jr. does not teach BER testing in a WDM system, and that each optical communication channel comprises two fiber links (see col. 1, lines 30-35.) Thus, Waschka, Jr. do not teach or suggest using BER testing in a WDM system with greater than two optical communication channels, wherein the optical communication channels are cascaded in a chain.
>
> Applicants, however, have disclosed a BER comparison step for use in a WDM system, wherein there are greater than two optical communications channels, and wherein the said channels are cascaded. Additionally, the system BER is used ultimately to determine which, if any, of the plurality of optical channels in a fiber in a WDM system are faulty. This also differs from Waschka, Jr., wherein the test signal on an optical communicaion channel (on two fiber links, see col. 1, lines 30-35) is measured against a prescribed level to ultimately use for isolation of a regeneration station, or the like, along a fiber link. Thus, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr. with Juniper.

Examiner respectfully notes that the standing rejections rely on Juniper to provide the teaching of BER testing (BERT on p. 8) in a WDM system (the Sentry DWDM system in Fig. 9 is a WDM system), not Waschka, Jr. Additionally, note that the "test signal" of Waschka, Jr. is also a BER test signal (Waschka, Jr., col. 19, l. 25-29) for a BER comparison step (implied by Waschka, Jr., col. 19, l. 31-32; col. 31, l. 3-4) for an optical communication system, wherein there are greater than two optical communication channel, and wherein the said channels are cascaded (Waschka, Jr., cascaded channel links in Fig. 1, col. 19, lines 25-28), similar to Applicant's own invention. Furthermore, note the similarities of the system of Waschka, Jr. and Juniper, such as: BER testing units (Juniper, BERT on p. 8; Waschka, Jr., bit error rate

test unit 22 in Fig. 8), cascaded optical communication channels (Juniper, concatenated spans in Fig. 9; Waschka, Jr., cascaded channel links in Fig. 1, col. 19, lines 25-28), and optical transmitter/receiver pairs (Juniper, transmitter/receiver pairs implied in Fig. 9; Waschka, Jr., Figs. 2-4, optical transceivers). Such similarities between the systems of Waschka, Jr. and Juniper make it obvious to apply the teachings of Waschka, Jr. with Juniper. Accordingly, Applicant's first point is not persuasive.

Regarding the second point, Applicant states (p. 12, middle paragraph – p. 13, 1st paragraph):

> Waschka, Jr. merely teaches a fault location technique to determine which station along a fiber link is faulty, in which an "***operator selectively interrogates** the data/voice control units in the stations along the link*, using the alarm interrogate unit . . . in order to cause the BER test logic of the addressed station to provide a BER indication on the basis of the test sequence. In this manner, ***the location of the fault may be isolated by sequential testing** of the stations along the channel.*" (Emphasis added). In other words Waschka, Jr. teaches a system in which an operator must selectively interrogate units along a fiber link and in which sequential testing is required. There are no such requirements in the present invention for monitoring and determining which optical communication channels in a WDM system may be faulty. Rather, the present invention identifies, with a diagnostics analyzer that analyzes a plurality of transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output signals from each optical receiver, which of the N optical communication channels has an associated bit error rate value that is greater than a specified bit error rate value, and thus is a faulty communication channel that needs correction, as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs. Thus, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr. with Juniper, nor would it be logical to include the teachings of Waschka, Jr. requiring an operator, selective interrogations on stations along a fiber link, and sequential testing of the stations along the channel.

Examiner respectfully notes that Applicant's claims do not exclude selective interrogation and sequential testing, so Applicant's point about interrogation and sequential testing is not persuasive. Additionally, each station of Waschka, Jr. does include the step of identifying a faulty communication channel (col. 5, l. 40-42, col. 31, l. 19-21) with a diagnostics analyzer (alarm units in Figs. 10-11; diagnostic output signals in col. 3, l. 30-45; col. 19, l. 30-40) and performance monitors (BER circuitry in each station, col. 19, l. 30-33) that is similar to Applicant's step of identifying.

Regarding the third point, Applicant states (p. 13, middle paragraph – p. 14, 1st paragraph):

In regard to 3) a diagnostic analyzer to analyze diagnostic output signals from said transmitters and said receivers and to identify at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check because said measured bit error rate is greater than said predetermined bit error rate threshold , which, as Examiner has noted in not taught or suggested in Juniper but would be obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr., Applicants respectfully disagree.

Examiner specifically states that a diagnostics analyzer is taught by Waschka, Jr. at Col. 31, lines 3-4. However, earlier, Examiner used that exact same reference location in Waschka, Jr. equating it to a BER test device for the purposes of measuring and comparing a BER system measurement. The BER tester and the diagnostics analyzer of the present invention are not one in the same. The BER tester is comprised of a BER test signal generator and a BER detector. While the BER tester is working and where the measured system BER for the WDM optical communication system exceeds the predetermined BER threshold for any of the communication channels, a diagnostics analyzer is used to analyze the transmitter output signals of the optical transmitters and the receiver output diagnostic output signals of the optical receivers in the WDM communication system. At that point, the diagnostics analyzer identifies which optical communicaion channel(s) are faulty by determining where excessive bit errors were detected by the on-board diaghostics circuits (performance monitors) on each of the optical transmitters and

optical receivers in the cascaded chain of optical communication channels and communicated to the diagnostics analyzer. By use of not only a BER tester, but also a diagnostics analyzer, the optical communication channel(s) which are not within specification are identified so that corrective measures may be taken. This is not taught or suggested by Waschka, Jr. nor would the fault location teachings of Waschka Jr., as discussed above, be suitable for inclusion in Juniper. Additionally, the alarm interrogation units of Waschka, Jr. are used as part of an operator's selective interrogation of data/voice units (see Col. 19, lines 35-40) and are not the results of internal performance monitors in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs providing data to a diagnostics analyzer.

Examiner respectfully notes that col. 31, l. 3-4 was referenced for the bit error rate tester (see Office Action mailed on 02 June 2006, page 5, last full paragraph), not the diagnostic analyzer. Similar to Applicant's invention, Waschka, Jr. also discloses a separate bit error rate tester (col. 31, lines 3-4; BER detector 176 in Fig. 8, col. 19, l. 29-35) and a separate diagnostics analyzer (alarm units in Figs. 10-11; col. 5, l. 31-49; col. 31, l. 19-21). Additionally, the diagnostics analyzer of Waschka, Jr. (alarm units in Figs. 10-11; col. 5, l. 31-49; col. 31, l. 19-21) receives the results of internal performance monitors in each transmitter/receiver pair (BER test circuitry in each station, col. 19, l. 30-33). Furthermore, in view of the

obviousness argument about decentralizing the fault location process from a transmitter/receiver pair to other locations, such as each transmitter and each receiver (see treatment of claim 1 above), an obvious variation of the apparatus of Juniper in view of Waschka, Jr. would include the internal performance monitors in each of the optical transmitters and each of the optical receivers. Accordingly, Applicant's third point is not persuasive.

Regarding the fourth point, Applicant states (p. 14, two middle paragraphs):

> In regard to 4) internal performance monitors in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs, which, as Examiner has noted in not taught or suggested in Juniper but would be obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr., Applicants respectfully disagree.
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> Applicants note that while Waschka, Jr. does teach BER test logic at a station along a fiber link (col. 30-33) that is accessed only after an operator patches into the station's BER test logic by a BER tester, and wherein the test logic of each respective station "can be selectively addressed to isolate the location of the cause of the BER degradation." (Col. 19, lines 31-35), there is no on-board diagnostics circuit (performance monitor) that is actively monitoring BER on each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs providing data to a diagnostics analyzer. Thus, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr. with Juniper.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., *on-board diagnostics circuit (performance monitor) that is actively monitoring BER on each of the optical transmitters and each of the optical receivers*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Additionally, these features are also not in the specification. Accordingly, Applicant's fourth point is not persuasive.

Summarily, Applicant's arguments are not persuasive. Therefore, Examiner respectfully maintains the standing rejections.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSK

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER